Remarks

Applicant acknowledges the Examiner's detailed analysis and comments on the pending claims and the cited prior art in the Office Action. This application ahs been amended t0 place it a condition for allowance. Reconsideration and allowance of the application are respectfully requested.

Applicant gratefully acknowledges the allowance of Claims 19-21, and 26-29. To expedite the prosecution, the rejected Claims 5-15 and 22-25 have been canceled and thus the rejections thereto have been obviated. Claim 26 has been amended to include all features in the base Claim 22. As such, Claims 26-29 are now in a full condition for allowance and the objection to their dependence on a rejected claims is moot.

Claims 1-4 stand rejected under 35 USC 103(a) as allegedly being obvious over Bergh in view of Myatt. This contention, however, is respectfully traversed because Claims 1-4 are distinctly different from the alleged combination of Bergh and Myatt and thus are patentable.

Claim 1 recites a device that measures the signal-to-noise ratio or degree of polarization of an optical signal. This device includes a fiber loop, an optical coupler in said fiber loop to couple input light into said fiber loop as two counter-propagating waves in said loop and to couple light in said loop out as an output beam; a polarization device in said fiber loop to change polarization of light in said loop to achieve a maximum power level and a minimum power level in said output beam; an optical detector to receive said output beam to produce a detector signal; and a circuit to process said detector signal to produce an output indicative of a signal-to-noise ratio or a degree of polarization in said input light from said maximum and minimum power levels. Notably, the polarization device is in the fiber loop to change polarization of light in the loop to

achieve a maximum power level and a minimum power level in the output beam measured by the optical detector.

Bergh discloses a fiber optic rotation sensor using a fiber interferometer loop in FIG. 1. More specifically, in Bergy's sensor, a phase modulator 28 is coupled in the loop to modulate the optical phase of the loop and to use a lock-in amplifier to detect the optical interference signal received at the detector 20 to measure the rotation rate of the loop.

This rotation sensor by Bergh is very different from the device in Claim 1. The Office Action apparently seizes on the use of the fiber loop in claim 1 and in Bergh and completely ignores the fundamental differences in the structure and operation of the device in Claim 1 and the rotation sensor by Bergh.

First, the Office Action contends that the signal generator 26 in FIG. 1 in Bergh processes the detector signal from the optical detector 20. This contention is clearly not supported by Bergh. Referring to FIG. 1 in Bergh, the signal generator 26, as its name implies, generate a modulation signal 30 to control the frequency of the phase modulator 28 and a frequency reference signal 32 at the same frequency to the lock-in amplifier. Contrary to what is stated in the Office Action, Bergh does not describe nor suggest that the signal generator 26 is used to process the detector output from the detector 20. In fact, Bergh discloses that the lock-in amplifier is used to process the detector signal from the detector 20 (Col. 6, lines 12-29).

Second, the Office Action contends that the signal generator 26 in Bergh produces an output indicative of a signal-to-noise ratio or a degree of polarization of the input light and cites Col. 13, lines 1-2 in Bergh to support this contention. However, Col. 13, lines 1-2 in Bergh simply states that the source light may have a degree of polarization and

provides nothing related to the contention made in the Office Action.

Third, the Office Action contends that the signal generator 26 in Bergh produces an output indicative of a signal-to-noise ratio or a degree of polarization of the input light from the maximum and minimum power levels measured at the optical detector 20. In this regard, the Office Action cites Col. 19, lines 17-32 in Bergh to support this contention.

However, the cited Col. 19, lines 17-32 in Bergh states the depth of grooves 152A and 152B in couplers 12 and 14 shown in FIG. 18 varies from a minimum at the center of the blocks 153A and 153B, respectively, to a maximum at the edges of the blocks 153A and 153B, respectively. This cited portion in Bergh has no logical connection with the recited circuit to process said detector signal to produce an output indicative of a signal-to-noise ratio or a degree of polarization in said input light from said maximum and minimum power levels as stated in Claim 1.

Therefore, the contention made in the Office Action to support the rejection seems to be entirely based on misreading or mis-application of the technical description in Bergh.

Notably, the Office Action further contends that the polarization device 348 in FIG. 21 of Myatt can be inserted into the fiber loop in Bergh so that the combination would disclose all features in Claim 1. This alleged combination is flawed for the purpose of 35 USC 103(a) in part because, as discussed above, Bergh fails to disclose features in Claim 1 and in part because the suggested combination does not make technical sense based on teachings in Myatt and Bergh. With respect to the latter, the Office Action fails to explain how this insertion of the polarization device 348 in Myatt would affect the operation of a polarizer inserted at the fiber section 130 in Col. 22, lines 21-35 and the interferometry operation of the whole device in FIG. 1 of Bergh.

Therefore, Applicant respectfully suggests that the Office Action fails to make a prima facie showing of obviousness based on Bergh and Myatt because the suggested combination does not teach each feature in Claim 1 nor does the suggested combination have any support from the disclosures of Bergh and Myatt. As such, Claim 1 is patentable over Bergh and Myatt.

Similarly, Claims 2-4 are patentable over Bergh and Myatt for at least the above reasons and based on their own merits.

Claims 16 and 18 stand rejected under 35 USC 103(a) as allegedly being obvious over Chung in view of Liu and further in view of Jung and Claim 17 stands rejected under 35 USC 103(a) as allegedly being obvious over Chung, Liu, Jung and further in view of Myatt. This contention is also respectfully traversed.

An example for the devices in Claims 16-18 are shown in FIG. 9 of the present application. The recited filters in Claim 16 are disposed in one of the two monitor beams for the different WDM channels by the PBSs, respectively. Each filter is operable to produce a difference in power between noise power levels in the two monitor beams for each WDM channel without affecting signal power levels in the WDM channel in the two monitor beams.

In this regard, the paragraph [0045] of the specification in the present application provides that the recited optical filtering causes an imbalance between the noise power levels in the two output beams with orthogonal polarizations. This imbalance is used for simultaneous and independent monitoring of both SNR and DOP.

Nothing, however, in the cited references suggests the structure in the device in Claim 16 and the above features associated with the device in Claim 16.

Referring to FIG. 5 in Chung, a quarter-wave plate 41 and a linear polarizer 42 are used to control the polarization of light incident to the photodetector 43 to measure the signal-to

noise ratio. Liu disclose WDM Demultiplexing that uses PBS 522a as shown in FIG. 5. The Office Action fails to show that how the PBS 522a in Liu can be used in the device in FIG. 5 of Chung to perform the signal-to-noise measurement described in Chung. In FIG. 4 in Cheung, the detector 43 is placed to receive the output of the linear polarizer 42. The Office Action fails to explain how the PBS 522a in Liu can be used in the device in FIG. 5 of Chung without changing the desired optical arrangement required by Chung.

The Office Action also contends that the filters 722 and 744 in FIG. 7 of Liu can be used in FIG. 5 of Chung to perform the filtering function of each filter in Claim 16. How is this possible? The Office Action fails to explain.

Notably, the filters in Liu are used to separation of different channels at different WDM wavelengths. In Claim 16, however, each filter is operable to produce a difference in power between noise power levels in the two monitor beams for each WDM channel without affecting signal power levels in the WDM channel in the two monitor beams. Nothing in Liu suggests this. Chung is completely silent in this regard.

The third reference Jung certainly does not provide any guidance on the above questions on the contended combination.

Therefore, it is respectfully suggested that the combination of Chung, Liu and Jung fails to disclose each feature in Claim 16. The rejection is improper and must be withdrawn.

Similarly, rejections to Claims 17 and 18 are improper and must be withdrawn.

Therefore, Claims 16-18 are patentable under 35 USC 103(a).

Turning to Claim 30, the Office Action cites Chung to support its rejection under 35 USC 103(a). The disclosure in Chung, however, does not support the contention made in the Office Action.

First, Claim 30 recites separating each WDM channel into a first beam and a second beam with orthogonal polarizations in a way that noise power level in said first beam is different from a noise power level in said second beam. The Office Action cites WGR 56 and coupler 57 to show this aspect of Claim 30. Upon review of Chung, Applicant fails to find any description in Chung on splitting a beam into two beams with orthogonal polarizations by using WGR 56 and coupler 57.

Second, Claim 30 recites adjusting polarization of each WDM channel prior to separation into said first and said second beams to find a maximum power level and a minimum power level in each of said first and said second beams. This feature, again, is missing from the disclosure in Chung.

Third, Claim 30 recites determining both a signal-to-noise ratio and a degree of polarization of each WDM channel in said monitor beam. Chung only discloses measurement of signal-to-noise ratio and does not disclose this feature of Claim 30.

Therefore, Claim 30 is patentable under 35 USC 103(a).

In summary, all pending claims are patentable and the application is now in a full condition for allowance. An official notice of allowance is respectfully solicited to issue at an early date.

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper.

Please apply any credits or additional charges to deposit account 06-1050.

Respectfully submitted,

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